GCA

GCA CORPORATION
Technology Division

213 Burlington Road
Bedford, Massachusetts 01730
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16 March 1983

Environmental Protection Agency
Office of Waste Programs Enforcement
Hazardous Waste Management Division
401 M Street, SW
Washington, DC 20460

Attention: Mike Kosakowski

Subject: Contract No. 68-02-3168, Technical Service Area 3, Work Assignment No. 78, Assignment Change No. 2 (GCA 1-619-078)

Gentlemen:

In accordance with Paragraph VI.1. of the subject Work Assignment, enclosed herewith are three (3) copies of the Revised Work Plan prepared hereunder in accordance with the IERL reporting specifications.

Very truly yours,

Arthur Engelman
Manager, Contract Administration

cc: Malcolm Huneycutt
(w/1 copy)

Alice Gagnon
(w/1 copy)

Julie Klaas
(w/3 copies)

AE:jaf

WORK PLAN SUMMARY (WP-1)

FOR PROJECTS SUPPORTED BY
INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH & DEVELOPMENT/ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

Project title: SOIL SAMPLING AT THE REILLY TAR SITE, ST. LOUIS PARK, MINNESOTA

Contractor name, division: GCA CORPORATION, GCA/TECHNOLOGY DIVISION

Contractor project manager: Russell J. Wilder (617) 275-5444

Address: 213 Burlington Road (Street) Bedford (City) MA (State) 01730 (Zip code) Phone

EPA project officer: Michael Kosakowski

1 [6 8 0 2 3 1 6 8] Contract No.

9 [78 - (3)] Task/TD No.

12 [M M D D Y Y: 0 3 1 6 8 3] Date work plan submitted

18 [B]

19 [01]

21 [M M D D Y Y: 0 7 0 6 8 2] Project start date

27 [M M D D Y Y: 0 6 3 0 8 3] Project completion date

Check one: 33 [ ] Original 34 [X] Revision

Reason for revision: Additional tasks requested by EPA Project Officer.

Project location. 35 [M A] State 37 [0 1 7 3 0] Zip code

Bedford (City) Middlesex (County) USA (Country)

Project type:

Costs. Estimated contract cost

Contract fee

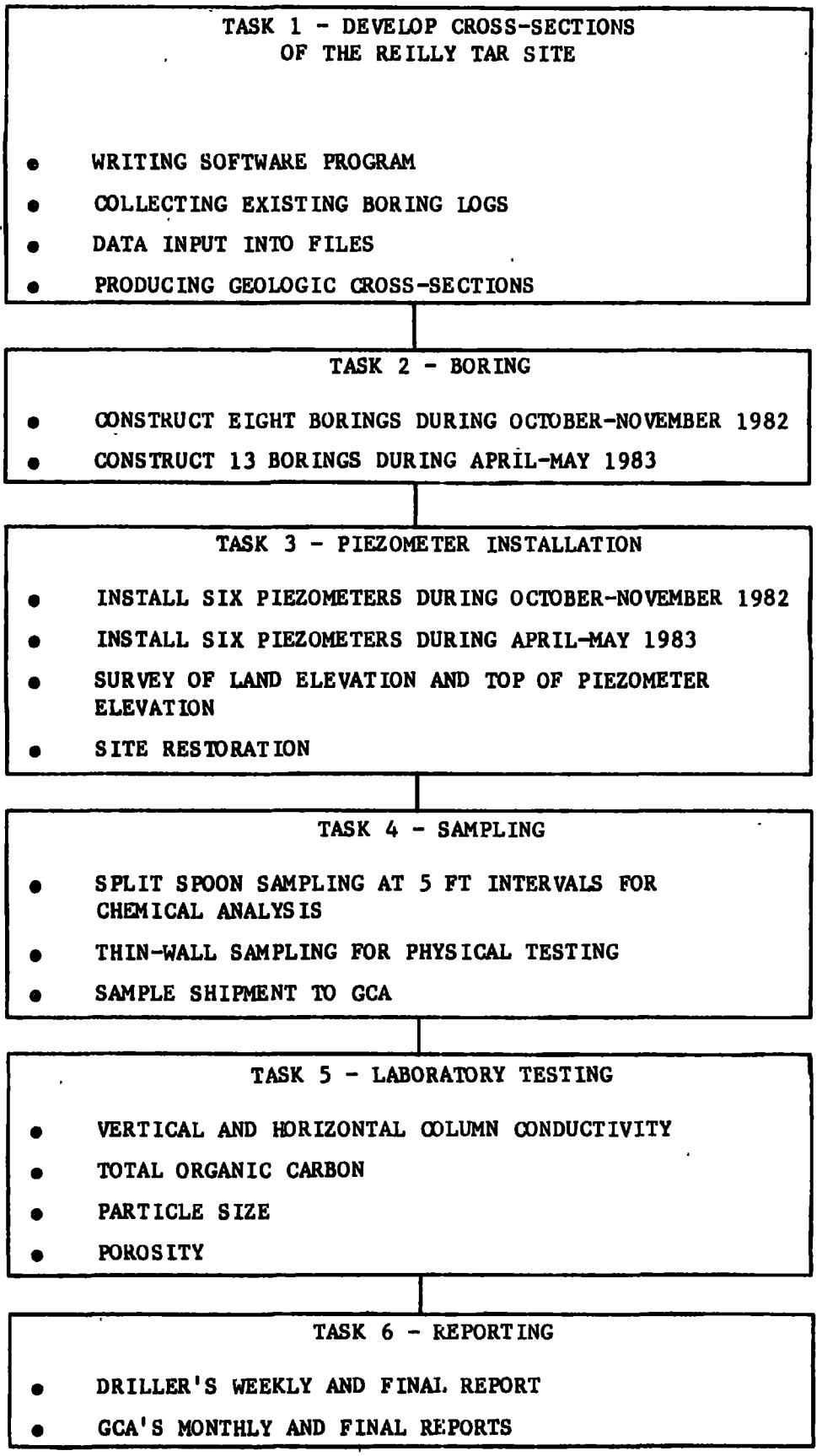
Project objective (50 typed characters- elite - 12 pitch).

19 03 21 Primary objective is to supervise a sampling
04 program at the Reilly Tar site to obtain soil sam-
05 ples for analysis to determine the presence of coal
06 tar derivatives beneath the former Reilly Tar site
07 in St. Louis Park, Minnesota. The program will
08 include a total of 21 soil borings and installa-
09 tion of 12 piezometers. A data management and
10 computer program will be provided for editing and
11 managing exiting data files. A computer-graphics
12 software package will be developed and will be used
13 to generate geologic cross-sections from existing
14 borehole data.

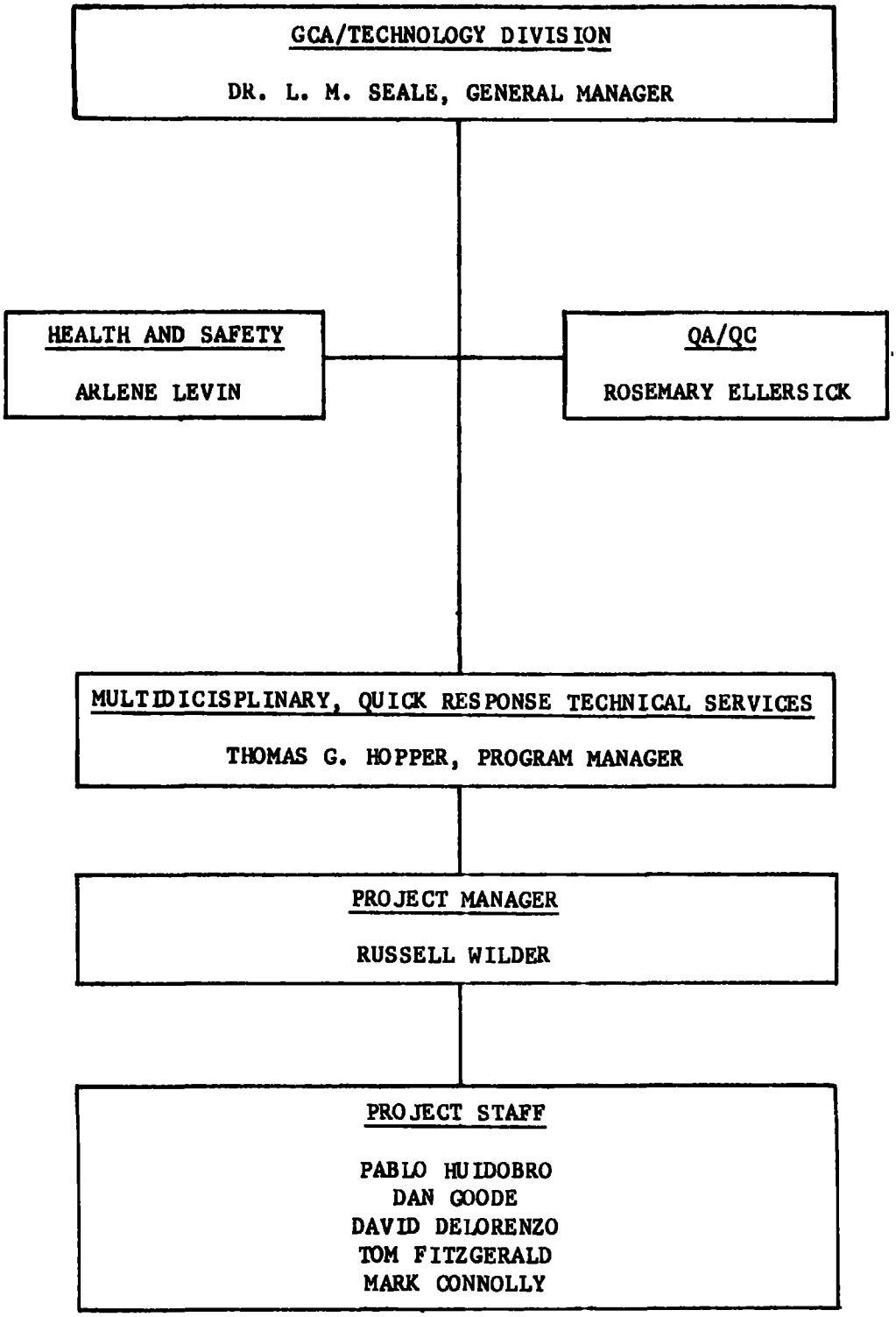
77 [ ] a 78 [ ] b 79 [ ] c 80 [ ] d

DO NOT WRITE IN THIS SPACE

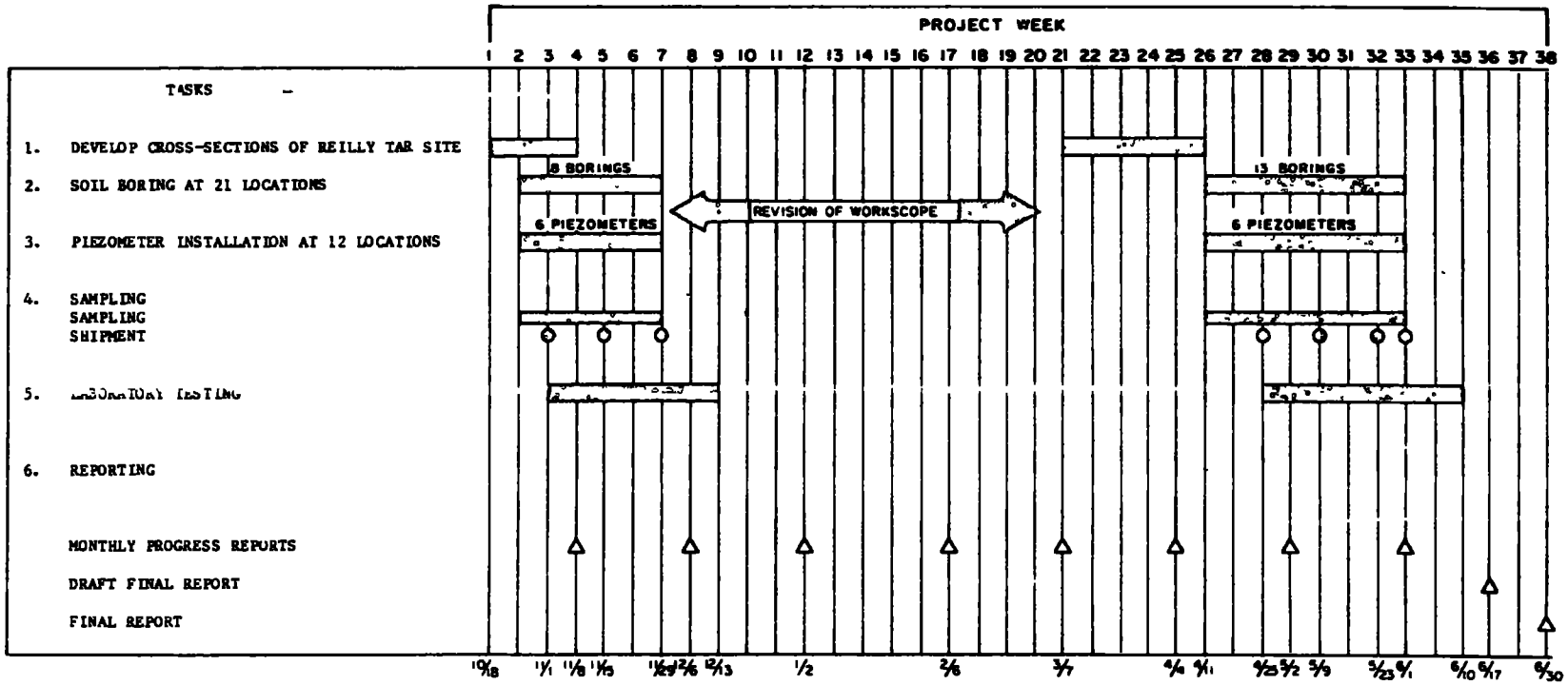
2.0 WORK STRUCTURE BREAKDOWN



3.0 PROJECT ORGANIZATION CHART



4.0 PROJECT SCHEDULE AND MILESTONES



COST/SCHEDULE BASELINE (WP-2)

Contractor: GCA/TECHNOLOGY DIVISION
GCA CORPORATION

Contractor project manager name, title: R. Wilder
Environmental Engineering Department

Revision No. 1

Date: 16 March 1983

EPA project officer: M. Kosakowski

Signature: R. Wilder

68-02-3168 — Contract No
78(3) — Task No
16 March 1983 — Date
Approval by EPA project officer[a]

(1) Work breakdown structure No.	(1) Noun description	(2) Cumulative cost to date ($1000's)[b]	(3) Monthly budgeted cost of work scheduled (BCWS)[b,c] ($1000's) Mo. 3 Yr 83	Mo. 4 Yr 83	Mo. 4 Yr 83	Mo. 6 Yr 83	Mo. Yr.	Mo. Yr.	Mo. Yr.	Mo. Yr.	Mo. Yr.	Mo. Yr.	(4) Total budget ($1000's)[b]
	WA No. 78	71.8	20.9	20.9	20.9	7.0							141.5
General and administrative		0	0	0	0	0							0
Management reserve													
Total		71.8	20.9	20.9	20.9	7.0							141.5
Cumulative total cost *(excluding fee)*		71.8	92.7	113.6	134.5	141.5							

[a] Once the cost/schedule baseline has been approved, the figures may not be changed without the approval of the EPA project officer.

[b] All costs shown are exclusive of fee

[c] Montly budgeted costs for entire contract—attach additional sheets if necessary.

6.0 PROJECT DESCRIPTION

6.1 Technical Objective

The primary objective of this program is to obtain soil samples for analysis to determine the presence of coal tar derivatives beneath the Reilly Tar Site in St. Louis Park, Minnesota. The program is to include installation of a maximum of 21 borings and 12 piezometers during the performance of this project. GCA will also develop a computer graphics system that will be used to develop geologic cross-sections from borehole data.

6.2 Period of Performance

The field operations, data acquisition, and reports specified in the Scope of Work will be completed 38 weeks after the date of program initiation.

6.3 Scope of Work

TASK 1. DEVELOP CROSS-SECTIONS OF THE REILLY TAR SITE

GCA will collect, through its Subcontractor, Braun Engineering, boring logs in the vicinity of Highway 7 and the "Swamp." This will involve Braun Engineering obtaining permission from the Minnesota Department of Transportation and other clients, reproducing the boring logs, and supplying them to the Minnesota Pollution Control Agency (MPCA). MPCA, in cooperation with the U.S. Geological Survey (USGS), will standardize the boring logs in a format suitable for input to a computerized data base. Logs of the eight wells just completed by GCA will be included. GCA will compile this data base and construct, utilizing computer graphic techniques, cross-sections of the Reilly Tar Site. These cross-sections will be transmitted to MPCA and USGS. GCA will assist USGS and MPCA in interpretation of the logs and in the selection of boring locations.

TASK 2. BORING

1. General

a. Each boring will be advanced using rotary drilling techniques. Change in crew from commencement to approved completion will not be made except when such change is approved by the GCA Technical Field Representative (hereinafter, Technical Representative). The Subcontractor will not abandon a boring before reaching the depth required by the Technical Representative; nor the casing or other apparatus be removed except with the permission of the Technical Representative. All drilling should occur during daylight hours Monday through Friday. No drilling should occur on Government holidays so that Government officials can observe all the work. If certain phases of work on a well must be continued into the hours of darkness, sufficient lighting will be provided by the Subcontractor such that work may be carried out in a safe and efficient manner. The Subcontractor will obtain all necessary permits and utility clearances as well as provide roadway signs as necessary to perform the work described herein.

b. The location of a water source for drilling will be approved by the Technical Representative. The Subcontractor will provide, install, and maintain sufficient pumps and water lines to ensure an adequate water supply for the work. The digging of sumps for drill water will not be permitted. Portable mud tubs will be required. Discharge water will be controlled to prevent contamination, pollution, excessive erosion, and other damage. The place of discharge is to be designated by the Technical Representative.

2. Type

Borings will be selected as necessary for procuring split-spoon samples, thin-wall samples, installation of piezometers, and well development.

3. Number and Location

Eight (8) borings will be drilled during the first phase at locations designated by the Technical Representative and will be installed over a five (5) week period in October to November 1982. Thirteen (13) additional borings will be drilled during the second phase at designated locations and will be installed over a seven (7) week period in April-May 1983.

4. Depth of Borings

Borings will be advanced to the depths specified by the GCA Representative. The maximum depth of borings is estimated to be typically 75 feet.

5. Installation

Borings will begin with a 3.5 inch I.D. (or larger) hollow-stem auger fitted with a sampler taking samples approximately every 5 feet until the water table is encountered. The hollow-stem auger will be removed and 4-inch I.D. surface casing set to a depth of approximately 10 feet. Casings will be advanced vertically through earth and other materials, including boulders, to the depth below the surface of the ground that is required to maintain the sides of the borehole, or as directed by the Technical Representative. The casings will not be advanced ahead of the borehole, except as necessary to control the caving of the borehole walls. The hole will be advanced by approximately 5-foot increments by taking a Shelby tube or split-spoon sample, drilling 3 feet with a Tri-cone bit and adding 5 feet of H-type casing. Below the groundwater level, water or drilling fluid will be maintained within the boring at or above the groundwater level to prevent caving conditions and to prevent loss of circulation. The drilling fluid will be standard commercial bentonite mixed with clean water and will not be recirculated. All mud and cuttings will be disposed of in compliance with Minnesota Department of Health Requirements. No cuttings, chemicals, or other foreign materials will be introduced into the hole. The Subcontractor will be equipped with the hammer equipment necessary to drive the casing into the hole. The number of blows required to drive the casing each foot and the weight of the hammer and drop will be recorded.

TASK 3. PIEZOMETER CONSTRUCTION

a. Locations

The subcontractor will be required to install piezometers at twenve (12) locations to be selected by the Technical Representative in the manner described herein (Figure 1).

b. Drilling

The piezometers will be drilled straight, plumb, and free of any obstructions to permit easy installation of the well casing. Faulty alignment of the drilled holes will be corrected at the Subcontractor's expense.

c. Depth

The Piezometers will be installed inside a 4-inch minimum diameter hole and to a depth specified by the Technical Representative.

d. Pipe and Screen

The piezometer will be 2 inch I.D. galvanized steel, threaded and coupled, steam-cleaned, and in lengths of not more than 10.5 feet. The perforated interval will consist of a 3-foot long by 2-inch (I.D.) wire wound screen, No. 10 slot, galvanized steel and fitted with a 1-foot sump section with a plug at the bottom. This section will be installed at the bedrock/drift boundary. (Platteville Limestone.)

e. Filter Envelope Specifications

The filter envelope (gravel pack) will be composed of either Morie No. 0 sand, supplied by Jessie S. Morie & Son, Inc., Mauricetown, New Jersey, 03239, Ottawa sand, or approved equal as determined by the Technical Representative.

f. Washing

The drilled holes will be thoroughly washed to clean any sediment that may have built up on the hole wall during drilling. Additionally, clear water will be circulated through the perforated pipe, returning to the surface in the annular space, prior to placing the filter envelope. Washing will continue in holes while placing the filter envelope, until the return water is free of soil particles.

g. Placing Seals, Filter Envelope and Grout

The piezometer will be firmly sealed in 1 foot of bentonite pellets. Care shall be taken that none of this seal covers the perforated interval. The gravel pack will be placed to 2 feet

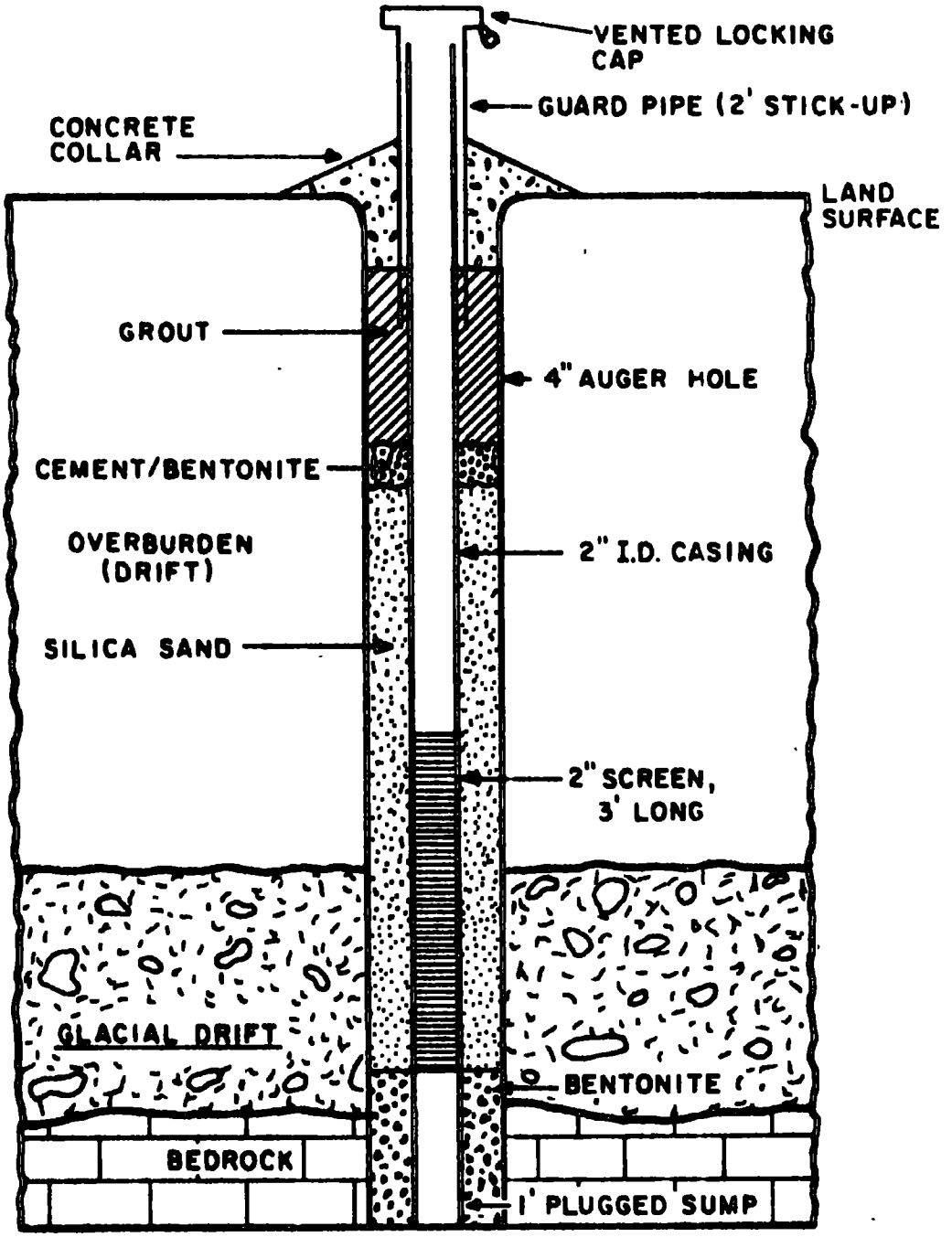


Figure 1. Typical completed piezometer for the Reilly Tar Site.

above the perforated interval. The annular space immediately above the gravel pack will be filled with a mixture of six parts cement and one part bentonite. This seal will be 1 foot thick. Immediately above this seal to 1 foot below the surface will be filled with grout. The H-casing will be removed as seals, gravel pack and grout is placed to assure that no voids remain in the annular space around the pipe and to prevent the pipe from becoming sand-locked in the casing.

h. Surface Seal and Protection

A 7-foot piece of 4-inch minimum diameter guard pipe with vented locking cap will be left in place and will be permanently cemented at ground surface to protect the riser pipe. The top of the pipe will extend 2 feet above the ground surface. Concrete will be set around the perimeter of the pipe and shall extend into the annular space in the borehole approximately 1 foot. The collar will extend above the ground surface approximately 4 inches and will slope away from the guard pipe to prevent surface water from collecting around the piezometer.

i. Piezometer Testing

Upon completion and prior to moving the drill rig, the Contractor must lower the water level in each piezometer by bailing or pumping to the lowest practical depth. This depth will be recorded to ensure proper operation. The well development will be done under the supervision of the Technical Representative.

j. Abandoned Holes

Any test hole or piezometer that does not satisfy the requirements herein described, and which the Subcontractor cannot make acceptable, will be declared an abandoned hole. All abandoned test holes will be filled by the Subcontractor according to the Minnesota Department of Health standards.

k. Survey

The top of each piezometer will be spirit-leveled to the nearest 0.01 foot above mean sea level. Land surface elevations will be determined to the nearest 0.1 foot above sea level. Leveling will be done in closed loops beginning at piezometers or bench marks of known elevation provided by the Government in "Elevations and Level Summary, St. Louis Park, Minnesota," Revised 9/1/81. Reference points are available within 1000 feet of the sites.

1. Site Restoration

The Subcontractor will attempt to avoid damage in connection with his drilling operations. If there is not sufficient cleared area for efficient operations he will consult with the Technical Representative. At the completion of drilling, piezometer installation, and well development, and before acceptance by the Technical Representative, the site will be restored as nearly as possible to its previous condition. All equipment will be removed, holes filled in, and debris removed in accordance with requirements of the Minnesota Pollution Control Agency (MPCA). The work specified in this Subcontract will not be considered complete until the site restoration is completed to the satisfaction of the Technical Representative.

TASK 4. SAMPLING

1. General

a. Cores of the materials penetrated during boring operations will be collected at intervals of approximately 5 feet, at changes in lithology, and at depths directed by the Technical Representative, who will also determine the type of sampler to be used for each sample.

2. Split-Spoon Sampling

a. The 3-inch I.D. split-spoon samplers are to be used. In order to facilitate extrusion of the cores from the liners, the Subcontractor will provide a special tip such that the internal diameter of the tip is reduced by twice the thickness of the liner wall. In addition, the Subcontractor will supply a commercial, spring loaded retaining ring which, at the direction of the Technical Representative, will be inserted between the barrel and the sampler tip. All split-spoon samplers will be fitted with segmented brass or stainless steel liners. The liners will consist of three segments of 6, 12, and 6 inches each to be provided by the Subcontractor. The samplers and liners will be thoroughly washed in water and rinsed in hexane in the laboratory of the Subcontractor prior to each use. The split-spoon sampler will be washed with clean water and both the sampler and the liners rinsed in hexane provided by the Subcontractor in the field immediately prior to use. After the sample is taken and the liner is removed from the sampler, the Subcontractor will store the liners in a clean, enclosed work area provided by the Subcontractor. In the clean area, the Subcontractor will extrude the sample into clean, sterile, labeled, glass jars provided by the Subcontractor. The Technical Representative will then proceed to log the core samples. After logging, the Subcontractor will store the jars in dry ice until shipment. Samples with excessive amounts of moisture may require partial dry ice freezing prior to extrusion from the liner sections.

b. The sampler will be driven by a 300-pound hammer having a 30-inch drop. The number of blows required for each 6 inches of penetration will be recorded by the Subcontractor for 24 inches of penetration. The Subcontractor will supply certification of the 300-pound hammer.

c. Once every 2 weeks, the Subcontractor will ship the processed cores packed with dry ice and packaged in conformance with EPA National Enforcement Investigation Center (NEIC) and Department of Transportation (DOT) requirements. Prepaid shipment will be made in locked coolers via DOT-approved carrier to GCA/Technology Division, 213 Burlington Road, Bedford, Massachusetts 01730 (Attention Sample Bank).

3. Thin-Wall Sampling

a. At locations and depths to be determined by the Technical Representative, undisturbed samples will be taken with a thin-walled, open drive tube sampler.

b. The 3-inch (O.D.) by 36-inch samplers will be constructed of seamless steel, with a 14 gauge wall thickness, and a bit clearance not greater than 0.5 percent.

c. The drill rig should be provided with a hydraulic pressure device capable of exerting a driving force of 8,000 pounds.

d. The sampling tube and sampler head must be smooth and thoroughly cleaned inside and outside before sampling and must be in proper working condition. The tube edge must be properly sharpened and have the correct inside clearance for the soil being sampled.

e. The drive should be made without rotation and with a continuous stroke. No additional drive will be attempted after the sampler stops.

f. The sampler containing the soil sample will be carefully removed from the hole and shipped to the Subcontractor's Laboratory for testing. For this purpose, the tube ends will be sealed with expanding packers.

TASK 5. LABORATORY TESTING

1. General

a. The Subcontractor will perform physical measurements on selected thin-wall tube corings at the direction of the Technical Representative. The laboratory tests listed herein will be performed in accordance with the appropriate ASTM,[1] or equivalent, standard methodology.

2. Measurements

a. Vertical column conductivity measurements using constant or falling head method as appropriate to the grain size. Method employed should be EM 1110-2-1906,[2] Appendix VII, or approved equivalent.

b. Horizontal column conductivity measurements using the same methodology as in item (a) above.

c. Total organic carbon. EPA Method 415.1,[3] or approved equivalent.

d. Particle size. ASTM method D-422[1] for sieving and hydrometer.

e. Porosity. Method EM 1110-2-1906,[2] Appendix II, or approved equivalent.

TASK 6. REPORTING

1. Driller's Report

a. Weekly Progress Reports--Each Monday, the Subcontractor will deliver to the GCA field representative a summary report in the form of a reproducible master and one (1) copy describing activities of the previous week and cumulative activities to date. This report will describe:

- o number, locations and depth of wells drilled
- o copies of driller's logs
- o number, location and types of tests performed
- o deviations from plan
- o plans for the next week
- o samples in storage
- o samples shipped
- o plans for problem resolution.

b. Final Report--A Draft Final Report in two (2) copies will be submitted within 2 weeks after the completion of drilling activities. This report will include detailed descriptions of equipment, techniques, and work accomplished. A Final Report in one (1) reproducible master and two (2) copies incorporating response to GCA to review comments will be submitted within two (2) weeks after receipt of comments.

REPORTS

1. Six copies of a brief Monthly Report describing progress to date, problems encountered and anticipated or proposed solutions will be submitted by the tenth of each month.

2. Within 15 days following completion of the technical effort, a draft Project Report of the work completed under this project will be submitted.

3. Within 15 days of approval by the Task Officer, an error free, reproducible manuscript of the revised draft of the Project Report will be submitted.

6.4 QUALITY ASSURANCE

GCA/Technology Division maintains a Quality Assurance Program under the direction of the division QA Manager, RoseMary Ellersick, who has revieved this Work Plan with the Task Manager. The QA Manager will attend project review meetings scheduled during this task to assure that appropriate QA/QC procedures are being followed.

Workbooks have been assigned to key technical personnel as noted below and will be used to make notations of pertinent information such as telephone and other conversations, meetings, significant references, process information, calculations, etc. The workbook assignments for this Task are as follows:

• Arlene Levin	1-619-078-01
• Pablo Huidobro	1-619-078-02
• David Cogley	1-619-078-03
• Dan Goode	1-619-078-04
• Nancy Krusell	1-619-078-05
• Russell Wilder	1-619-078-06
• Tom Fitzgerald	1-619-078-07
• Mark Connolly	1-619-078-08

The overall Program Manager, Thomas Hopper, is maintaining a log of all workbooks issued on each task so they can be identified and located. The Task Manager is responsible for all workbooks used on his work assignment and will indicate in the Master Log their disposition and location upon completion of the work assignment. The workbooks and any references such as journal articles or computerized literature searches which are purchased in support of this work assignment will be maintained as part of the permanent work assignment file and referenced in the Final Report, as appropriate. At least once during the period of performance, the QA Manager will audit workbook use. The QA Manager will coordinate QC measures for various segments of project activity and audit to see that they are being implemented.

6.5 SAFETY PLAN

The Subcontractor will adhere to the safety plan attached as Appendix A. The Subcontractor is responsible for the health and safety of the subcontractors employees. GCA will be exercising its own safety plan at this site for its employees independent of the subcontractor's program.

6.6 CHAIN-OF-CUSTODY/QUALITY ASSURANCE

The Subcontractor will follow the Quality Assurance procedures for sampling and testing as set forth in Appendix B. These procedures are subject to periodic review throughout the performance of this subcontract by the GCA/Technology Division Quality Assurance Manager, RoseMary Ellersick.

REFERENCES

1. ASTM methods as delineated in "1982 Annual Book of ASTM Standards," Part 19.

2. EM Methods as delineated in U.S. Army Corps of Engineers "Engineers Manual EM 1110-2-1906, Laboratory Soil Testing.

3. EPA Method as delineated in "Chemical Analysis of Water and Wastes," EPA-600/4-79-020.

APPENDIX A

HEALTH AND SAFETY PLAN

APPENDIX A 30 September 1982

HEALTH AND SAFETY PLAN

(GCA 1-619-078-222-001A)

The health and safety plan presented here is intended to be complementary to the GCA/Technology Division policy and, in concert with that policy, to provide all personnel onsite with a safe and healthy work environment. Dr. Roger Blomquist, Vice President/General Manager of Braun Environmental Laboratories will serve as safety officer for the subcontractor.

The specific safety plan will be finalized during Task 1. Details of the health and safety plan will be refined during Task 1 and during the conduct of the study if ambient monitoring and analysis results of sampling detects a change in the level of contaminants or constituents at the site.

The safety plan will include the assignment of responsibilities, personal protective requirements, work practices and emergency response procedures. Brown personnel will be equipped and trained by the Subcontractor for field investigations at an uncontrolled hazardous waste site. Enforcement and adherence to this plan will be implemented in a manner to prevent serious injury or other health hazards to the field investigators and the public.

The Reilly Tar site is located in a residential area with limited commercial and industrial activity. The actual site is a flat field with filled swamps and two ponds. The Minnesota Pollution Control Agency reported the following information on hazards at Reilly Tar:

"Workers having no protective equipment or clothing have experienced headaches and burns after contacting contaminated soil and smelling odors.

Compounds detected in the soil include:

- Polyaromatic hydrocarbons
- Phenol
- Benzene
- Aromatic Amines
- Toluene

- Cresol
- Polynuclear aromatic with sulfur or nitrogen"

A. RESPONSIBILITY

The Prime Contractor Safety Officer will be Arlene Levin who has responsibility for the GCA health and safety plan and its implementation. The safety officer who reports to the overall program manager, Russell Wilder, will recommend policy on all safety matters including work practices, training and corrective action for Prime Contractor employees. The Subcontractor will assign Dr. Roger V. Blomquist as safety coordinator. Dr. Blomquist will have specific responsibility for maintaining a high level of safety awareness, supervising or conducting training, insuring equipment availability and proper maintenance, enforcement of clothing and protective equipment use requirements, communicating with team members on safety matters, recommending to the project manager and safety officer improved safety measures and initiating immediate corrective actions in the event of an emergency or development of an unsafe condition.

The individual team members will be familiar with and conform to the safety protocol described in the safety plan.

B. TRAINING

Prior to any site activities, team members will participate in training programs developed by their respective safety officers. At a minimum, the training will cover:

- First Aid
- Recognition of conditions requiring emergency or medical care and simple steps to take until help arrives.
- Rescue operations
- Decontamination procedures
- Special chemical and physical hazards and potential health effects.

- Personal protective equipment use, maintenance, fit and limitations.
- Site evacuation
- Hands on training in simulated sites.

C. PROTECTIVE CLOTHING

All field sampling team members will be provided with protective clothing to prevent body contact with dust, vapors or liquids.

- Gloves--Edmont solvex gloves No. 37-155.
- Outerwear--Chemically resistant outerwear will consist of long sleeved jacket (Edmont jacket No. 65-560) and overalls (Edmont overalls No. 65-555).
- Disposable Outer Clothing--Disposable outer clothing (Edmont polycoated Tyvek jacket/pants No. 65-850) will be worn by onsite personnel working in dry areas. In addition, Edmont blue Tyvek coveralls No. 55-510 will be available.
- Shoes and Boots--Shoes and boots will have safety toes for all onsite work. Rubber shoes will be worn at all times on the site. Handlers and samplers will be required to wear sturdy fitted boots.
- Protective Headwear--Hardhats or equivalent will be required headgear onsite at all times.
- Eye Protection--Eye protection will be required onsite at all times. Contact lenses will not be permitted onsite. For onsite personnel full face respirators will be utilized. If full-face respirators are not worn onsite, chemical splash goggles with safety glasses will be worn.

All protective clothing will be examined daily prior to donning to check for defects, tears and noticeable contamination.

D. RESPIRATORY PROTECTION

The Reilly Tar site poses threat to health from exposure to toxic gasses. A full face air-purifying respirator with combination-type organic

vapor cartridge will be worn. Air purifying respirators will not be used if the gasses or vapors exceed their respective threshold limit value (TLV) by a factor of 5. If the work environment changes and it becomes necessary, the Subcontractor employees will utilize pressure demand self-contained respirators.

E. FIELD INVESTIGATION

The initial field investigations will be conducted in concert with the Prime Contractor Safety Coordinator. The initial field investigation constitutes a walk through the area to detect any observable conditions which may present a hazard to field investigators. Prior to commencement of work, the area of drilling for that day will be monitored with HNU survey instruments and the monitoring will continue throughout the operations and be repeated for each day of sampling.

Wind flags will be placed around the designated drilling area. Weather conditions will be monitored and any changing conditions used as a basis for reducing potential exposures.

Meetings will be held each morning prior to work activity to review the hazards present at the site and any changes in the level of personal protection required, special safety requirements for assigned work activities and emergency responses.

F. DECONTAMINATION

Contaminated materials must be decontaminated or isolated immediately. All materials will be assumed contaminated if they have been brought onto the site. EPA approved procedures for decontamination will be followed. Requirements for decontamination will be limited to using disposable sampling equipment. Motor vehicles entering the immediate vicinity of the site will be restricted to the absolute minimum. Vehicles which leave the site may require cleaning.

A wash station will be available for team members for rinsing off and decontaminating splashed clothing. It is important to remove quickly as much contaminant as possible to avoid breakthrough to inner clothing and skin. Any concerns by the Safety Coordinator or a team member about the removal of splashed material on clothing will be resolved by replacing the garment and either disposing of it or trying more rigorous cleansing.

Personal hygiene is the final step in decontamination. All team members who have worked on the site should immediately return to their homes to change clothing and shower after proceeding through the onsite decontamination of outer clothing. All clothing worn onsite should be laundered (separately from street clothing) before rewearing.

In order to minimize contamination of sample handlers, each sample bottle will be tightly capped in the field, labeled securely and placed in a plastic bag and sealed. The plastic bag will be transparent so that labels can be used. This bag is then placed in a clear outer bag and sealed. The outer bag must remain clean and any doubts about its cleanliness are to be resolved by placing it in yet another bag.

An onsite trailer will be provided for field personnel to change into protective clothing at the beginning of the work day and to change out of protective clothing and go through decontamination procedures at the end of the work day or when leaving the site.

An eye wash station will be provided at the decontamination trailer to prevent accidental rubbing or entry of materials into the eyes.

C. RECORDKEEPING

A site log with the required sign in, sign out procedure will be maintained at the site facility to document the time spent by each member on the site. This information will be supplemented by periodic air monitoring using a portable photoionization analyzer to measure total non-methane hydrocarbon levels in the air. An authorized copy of the site log and all air quality measurements will be kept by the safety officer. Chain of custody records will record the names of all personnel who have handled each sample.

A checklist will track all protective equipment brought onto the field each day to assure that decontamination is performed in the field and that any additional precautions, such as sanitizing face masks, is performed prior to reuse. Any equipment malfunction will be noted on the checklist and repaired before reuse. Other routine maintenance checks will be scheduled and recorded on a regular basis to insure that protective equipment is effective at all times.

Any chemical releases into air, water or soil will be reported to the Program Manager. Any personnel exposure resulting from such release or protective equipment failures will be reported in writing within 24 hours to the safety officer.

Employees working onsite will be required to have a physical examination prior to initiating onsite activities. The results will become part of the individual's personnel file.

G. EMERGENCY PROCEDURES

Before commencing any operations, all onsite personnel will be advised of potential hazards. Evacuation and rescue plans as well as emergency assistance personnel and equipment will be in place before any onsite activity commences. Factors to be considered in formulating emergency response readiness are first aid, CPR training, first aid equipment including eye wash stations, water availability, communications, rapid notification of fire, police and emergency medical facilities, presence of transport vehicles, fire fighting equipment and extra protective equipment including SCBA units.

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL PLAN

APPENDIX B 30 September 1982

QUALITY ASSURANCE/QUALITY CONTROL PLAN
(GCA 1-619-078-222-001A)

The Subcontractor project activities include well drilling, piezometer installation, collection of soil cores, preservation, handling and physical testing of some soil samples. Total Organic Carbon (TOC) analyses will also be performed on the samples. The Subcontractor will ship designated soil samples to the Prime Contractor.

The Subcontractor will assign overall responsibility for QA/QC on this project to an individual who will ensure that the Subcontractor's standard QC procedures will be appropriately applied to this project, and that the specific chain of custody and document control requirements outlined in this Appendix will be met.

Each key technical person will maintain an individual project workbook to be used for this project only. These workbooks will form part of the Project Document Inventory and will be submitted to the Prime Contractor at the conclusion of Subcontractor project activity.

A. WELL DRILLING ACTIVITIES

The Subcontractor will drill wells at sites identified by the Technical Representative using the equipment and specifications detailed in Exhibit A of the Subcontract. One field log book will be maintained for each drilling team. Documentation of drilling activities, as specified in Exhibit A and as Deliverables in the Subcontract, will be provided to the Prime Contractor. The Technical Representative will direct and observe all drilling operations and piezometer installations.

B. SECURITY MEASURES

The security of sampling equipment and samples will be maintained through the use of an onsite trailer or van as well as storage within a secured location at the Subcontractor headquarters.

The field storage facility will be utilized to store sampling equipment and collected samples in a manner to avoid contamination from any other materials or outside sources as well as to secure them from possible mishandling.

Samples and equipment stored at the Subcontractor headquarters will be stored in secure locations within the facility. Entrance to and exit from the premises specifically during the nonworking hours will be controlled.

C. SAMPLE COLLECTION PROCEDURES

Samples will be collected as directed by the Technical Representative and as detailed in Exhibit A, Task 3, of this Subcontract. The specified sampling equipment and sample containers will be cleaned as described in Exhibit A before use on samples. Sampling equipment will be cleaned in the field before each use. QC measures will include blanks and duplicates as described below.

1. Procedural Blanks--to monitor sampling equipment cleanup. After every tenth split-spoon sample has been collected, 100-200 ml deionized water will be used to rinse a clean sampler and liner. The water will be collected in a clean sample container of the same type used for field samples and processed as a field sample. The Sampler will note on the sample tag and in the field log that the sample is a procedural blank.

2. Field Blanks--to monitor general sample handling, including container cleanup. On each split-spoon sample collection day, 100-200 ml deionized water in an appropriately cleaned sample container of the same type used for field samples will be brought to the field and processed as a field sample. The Sampler will note on the sample tag and in the field log that the sample is a field blank.

3. Field Duplicates--to estimate precision of the overall measurement process. Ten percent of the split-spoon samples and the thin-walled tube samples will be collected in duplicate. The Technical Representative will identify the sites where duplicates will be collected; the Sampler will note on the sample tag and in the field log that the samples are duplicates.

These blanks and duplicate samples will be tested and analyzed as appropriate to the type of sample. The Technical Representative will ensure that new sample tags have been securely attached to blanks and duplicate samples so they are not recognizable as such to the testing laboratory.

D. SAMPLE HANDLING, STORAGE AND CONTROL

After geologic logging of the cores by the Technical Representative, samples collected in the field will be immediately cooled to approximately 4°C with ice and stored in styrofoam coolers. Samples for shipment to the Prime Contractor laboratory facility will be frozen and maintained in a secure freezer. Samples for soil testing will be maintained in a secure location away from other samples until testing is complete.

The following steps will be followed by the Subcontractor to ensure sample integrity and validity from the point of sampling to safe storage in the laboratory.

1. The number of people involved with handling the samples will be kept at a minimum.

2. Samples will be obtained using standard approved field techniques detailed in Exhibit A. Any deviations due to site conditions, weather, etc. will be reviewed with the Technical Representative to obtain approval and notations made in the Field Log and initialed and dated.

3. Every sample taken will have a unique identification tag attached to the sample container. The tag will contain such information as the project number, sample number, date, source or site of sampling, preservatives used and the name of the person who took the sample (Sampler); Section E discusses sample tags and custody records in more detail.

4. A chain-of-custody form will be used to record the following information: project number, Sampler's name and signature, sample identification, site or location of sampling, date and time, type of sample matrix, type of container, preservative steps taken, method of shipment and requested analysis.

5. The field Sampler has total responsibility for the samples until such time as sample custody is transferred to another responsible person involved in the next step of sample transport to the lab.

6. After sampling is completed, the samples will be packed in ice in a transfer container (typically a styrofoam cooler inside a heavy cardboard box). The transfer container will be secured against tampering or spillage. Every effort will be made to expedite the shipment of samples to the lab and maintain sample environment as close to 4°C as possible.

7. Upon arrival at the Subcontractor laboratory, the designated Sample Custodian is responsible for evaluating the condition of the samples with respect to:

   a. integrity of containers and seals,

   b. condition of sample matrix and,

   c. completeness of chain of custody information.

   Once satisfied that the samples are valid, the Sample Custodian will sign the chain of custody form signifying acceptance for analysis or shipment. Should there be a question about sample integrity or information received on the chain-of-custody forms, the samples must be held in abeyance pending the resolution of the question as noted in Section E.6 of this Plan.

8. Once received in the Subcontractor laboratory, samples will be logged and scheduled for analysis or shipment and remain in sample storage until such analysis or shipment is performed.

9. Samples shipped to the Prime Contractor will be handled as described in Step 7 above by the Sample Bank Manager.

E. CHAIN OF CUSTODY

1. Sample Identification

Sample collection tags will be preprinted to insure that the required information is provided on each tag. Each collected sample, including duplicates and field blanks, shall have a completely filled in sample tag securely attached to it. Duplicates and field blanks shall be identified in the remarks section of the tag.

The person who physically collects the sample is the Sampler who signs the sample tag. He may presign the tag if he will be in a hazardous condition when sampling. The exact time of sample collection will be recorded and all team members present shall be recorded in the field log book. The Sampler initiates the custody record for transfer of samples.

The Subcontractor Sample Custodian or the Technical Representative will maintain a bound sample log listing all samples collected and their respective tag numbers and disposition of the samples to the laboratory for analysis. The onsite trailer or van will operate as a sample bank with new sample tags assigned to the blank or duplicate samples so that they are not recognizable to the testing laboratory as blanks or duplicates.

2. Sample Transfer/Custody Records

Customized record sheets following NEIC format will be provided by the Prime Contractor for this project. They are two-part carbonless copy forms which correlate with the sample identification tags. Requested information has the same heading on both. On this project the custody record will document transfer of samples to the Subcontractor laboratories, to storage in a freezer maintained at the Subcontractor headquarters, and shipment of samples to the Prime Contractor's laboratory. Internal laboratory records will then track the samples.

The custody records will be used for a packaged lot of samples. More than one sample will usually be recorded on one form; more than one custody record sheet may be used for one package. Their purpose is to document the transfer of a group of samples traveling together; when the group of samples changes, a new custody record is initiated. The original of the custody record will always travel with the samples. The initiator of the record will keep the copy. When custody of the same group of samples changes hands several times, some people will not have a copy of the custody record. This will be acceptable as long as the original custody record shows that each person who had received custody has properly relinquished it.

3. Using the Custody Record

The Sampler will fill in all requested information from the sampling tags. The person receiving custody will check the sample tag information against the custody records, he will also check sample condition and note anything unusual under remarks on the custody form.

The originator (Sampler) will sign in the top left "Relinquished by" box and keep the copy. The person receiving custody will sign in the adjacent "Received by" box and keep the original. The date/time will be the same for both signatures since custody must be transferred to another person.

When custody is transferred to an analytical laboratory, blank signature spaces may be left and the customized last "Received by" signature box must be used. The unused signature boxes may be lined out to show they were not used. In all cases, it must be readily seen that the same person receiving custody has relinquished it to the next custodian.

4. Shipped Samples

Whenever a group of samples along with its custody form is to be shipped, the samples will be accompanied to the carrier so that if requested, the number and identification of the samples can be verified. The commercial carrier is not required to verify this nor to sign the custody records. Receipts of bills of lading will be maintained as part of the permanent documentation. The package will be closed with strapping tape and custody seals so that the carrier is transporting a secure container. The person receiving custody of shipped samples will be required to document the condition of the strapped and sealed box upon arrival.

5. Laboratory Custody

The onsite trailer or van, the Subcontractor's and the Prime Contractor's analytical laboratories are considered to be working laboratories. Each will have a designated Sample Custodian who accepts custody of the samples and implements a system to maintain control of samples within the laboratory. The laboratories will not be open to the general public and will have access restricted to employees known to each other. Each handling of the sample to renumber, subdivide, preserve, etc. will not be documented in this situation.

6. Questions/Problems

If discrepancies between sample tag numbers and custody record sheets are found, they should be documented and the sample stored under the proper conditions. The samples will not be analyzed until the problem is resolved by contacting either the Technical Representative, the Prime Contractor QA Manager, or another designated responsible authority.

The responsible person receiving custody will attempt to resolve the problem by checking all available information (other markings on sample containers, type of sample, etc.). He will then document the situation on the custody record and in his project work book and notify the Prime Contractor QA Manager by the fastest available means followed by written notification.

Changes may be written in the remarks section of the custody record and should be initialed and dated. A copy of this record should accompany the written notification to the QA Manager.

E. PHYSICAL TESTING AND TOC ANALYSIS

Physical testing will be performed on soil samples using the methods detailed in Exhibit A, Task 4. The person responsible for analytical QC will ensure that each person working on the samples documents all testing or analytical work in an individual laboratory notebook or a project laboratory notebook. Each notebook page shall be identified by the Project Code (RT-1-619-078) and dated and signed by the analyst.

Sample and standard preparation and dilution, instrument operating conditions, and calibration curves will be documented in notebooks or instrument logs. All raw data pertaining to this project will be identified with the Project Code and will form part of the Project Document Inventory as noted in Section F of this Plan.

Standard laboratory QA/QC procedures are briefly discussed below; they will be applied as appropriate to the project work.

Class A volumetric glassware will be used throughout wherever volumetric dilutions or transfers are required. All processes calling for nonvolumetric glassware will be performed in borosilicate labware. The

cleaning process of the various types of laboratory glassware and sampling containers will be specified to eliminate interferences due to contamination. All glassware will be detergent washed followed by tap water and deionized water rinses. Pipets and other glassware which may become coated with organic films will be subjected to an alcoholic potassium hydroxide bath for 24 hours followed by an acid bath (diluted hydrochloric acid) for 4 to 6 hours, and tap and deionized water rinses.

All reagents used will be analytical reagent grade and, where appropriate, spectroquality reagents will be utilized. Laboratory deionized water must pass ASTM Type II water specifications (ASTM D1193-74). Standard curves in the expected concentration ranges of the samples to be analyzed will be run each day to standardize the instruments. Random standards will be run periodically during analysis to check for drift in instrument response. The analytical curve will also be run after all samples have been analyzed as a final check on the stability of instrument response. QC measures will include blanks, duplicates and spiked samples as described below.

1. Deionized laboratory water blank will be run after every 10 field samples to monitor the overall analytical system.

2. Reagent blank--To determine background effect or contamination caused by the reagents used in sample preparation and anaysis. One reagent blank will be processed with each block of 10 field samples analyzed by a particular method.

3. Laboratory duplicates--To estimate precision of the testing or analytical work. Two aliquots from 1 field sample on each block of 10 samples analyzed by a particular method will be carried through the entire testing procedure.

4. Spiked samples--One field sample from each block of 10 samples analyzed by a particular method will be artificially spiked with analytes found in the unspiked field sample. The spiking level will be approximately 50 percent greater than the level found in the unspiked sample.

Acceptance limits will be established for these blanks and spiked samples; if these limits are exceeded, corrective action will be initiated. Sample results will be blank-corrected, unless corrective action indicates this should not be done. Corrective actions will be documented and approved by the responsible QA/QC person.

In addition, Quality Control samples provided by outside agencies such as the EPA will be run to provide an independent check on the entire analytical system. All QC data will be reported to the Prime Contractor.

F. DOCUMENT CONTROL

The purpose of document control is to insure that all project documents will be accounted for when the project is complete. The Subcontractor will designate a Document Control Officer (DCO) for this project. He will be responsible for issuing, controlling and maintaining records of the controlled documents. At the conclusion of the project, all controlled documents with records shall be provided to the Prime Contractor for inclusion in their overall Project Document Inventory. The DCO shall maintain the log of all serialized documents used. If any of these controlled items are damaged, lost or voided, this will be so noted in the log. In addition, the DCO will serve as sample custodian for samples collected in the field.

The Subcontractor DCO will issue, control and maintain records of controlled documents. Each key technical person working on the project will be required to maintain an individual project log book. One field log book for each drilling team will be maintained. The project numbering system is outlined below.

1. Project Code

The project code for the Reilly Tar study is RT 1-619-078. This number will appear on sample identification tags, custody records, log books, field data sheets, driller logs, core logs, project memos and reports, document control logs, corrective action forms and logs, QA plans and all other project records. In addition, the Subcontractor code will be placed on all documents except sample collection tags and custody records. See Section 3 below.

2. Preserialized Documents

Sample collection tags and custody records will have preprinted serial numbers on them. It is not necessary that a tag number match a custody record number. It is necessary that the Subcontractor DCO maintain records which account for all serially numbered items received from the Prime Contractor. If tags or custody records are damaged, lost or destroyed before used for their intended purpose, the serial number of the item and its disposition must be recorded.

3. Other Documents

Other documents will use a numbering scheme similar to that identified herein to enable unique identification of each item. The numbering scheme includes the project code, subcontractor code, document code and serial number as shown below.

Project Code	Subcontractor Code	Document Code	Serial Number
RT 1-619-078	-02-	-A-	-00001

Table B-1 presents a suggested document code. The Subcontractor's DCO will finalize the system to be used for their documents; it is desirable that suggested document codes be used to facilitate compiling the overall Project Document Inventory.

At the conclusion of the project the Subcontractor DCO will account for all project documents and number them, and a contents listing of the documents will be prepared. The Subcontractor will photocopy any documents it wishes to retain in its project file. The DCO will keep a copy of the contents listing and place one copy in a shipment box containing the original documents. The complete Project Document Inventory will then be shipped to the Prime Contractor.

TABLE B-1. SUGGESTED DOCUMENT CODES

Document	Code Letter
Project Work Plans	A
Project Logbooks	B
Sampling Logbooks	C
Drillers Logs	D1, D2, etc.
Field Data Sheets	F
Laboratory Notebooks	G
Laboratory Data Sheets	H1, H2, etc.
Sample Logs	L1, L2, etc.
Internal Memos	M
External Written Communications	N
Confidential Information	O
Photos, Maps, Drawings	P
QA Plan	Q
Reports	R
Final Report	FR
Miscellaneous	X

C. CORRECTIVE ACTION RESPONSIBILITY

The Subcontractor will assign responsibility for initiating corrective action on each aspect of project activity. The Technical Representative, Pablo Huidobro or other designated individual, will observe all field activities and initiate corrective actions as necessary.

All corrective actions taken will be documented in laboratory notebooks or project workbooks or on Corrective Action Forms; the project code (RT 1-619-078) will identify the written description of the problem found and the actions taken. The documentation will be submitted as part of the Project Document Inventory.

7.0 COST ESTIMATE

GCA/TECHNOLOGY DIVISION
A DIVISION OF GCA CORPORATION
Bedford, Massachusetts 01730

16 March 1983

COST ESTIMATE - ORIGINAL SUBMISSION DATED 1 OCTOBER 1982

SOIL SAMPLES AT THE REILLY TAR SITE

Contract No. 68-02-3168, Technical Service Area 3, Work Assignment No. 78
(GCA 1-619-078)

Group Scientist/Engineer	180 hours @ $20.22/hr[2]	$ 3,640
Principal Scientist/Engineer	100 hours @ $15.62/hr	1,562
Senior Scientist/Engineer	180 hours @ $11.68/hr	2,102
Scientist/Engineer	496 hours @ $ 9.67/hr	4,796
Senior Technician	294 hours @ $ 7.57/hr	2,226
Technical Illustrator	60 hours @ $ 7.56/hr	454
Technical Typist	120 hours @ $ 6.27/hr	752
Total Direct Labor	1,430 hours[1]	$15,532
Salary Related Cost[3] (32.5%)		5,048
Subtotal		20,580
Engineering Overhead[3] (88.0%)		18,110
Material (see Page 3)		1,748
Travel (see Page 4)		8,126
Subcontracting (see Page 5)		33,000
Other Direct Costs (see Page 6)		2,187
Subtotal		83,751
General & Administrative Expense[3] (3.7%)		3,099
Total Estimated Cost		86,850
Fixed Fee[4]		3,150
TOTAL ORIGINAL SUBMISSION COST		$90,000

NOTES PERTAINING TO PAGE 1:

(1) Of this 1,430 MH total, 1,250 are technical man-hours which is in contrast to the Government estimate of 450 TMH.

(2) Use of direct labor bidding rate schedule applicable to 1982.

(3) Use of GCA/FY 1982 provisional indirect rates requested on 14 January 1982.

(4) In accordance with Article VIII, Paragraphs C.1 and C.2 of Option No. 2 to the basic contract, the fee employed herein is calculated at $2.520 per technical man-hour.

(5) Additional Contract Funding - the total ODC proportional to a Work Assignment of 1,250 TMH is $4,541, the total estimated cost is $45,007, the fee is $3,150 for a total cost of $48,157. As can be seen from Pages 2-6, the total estimated ODC is $45,061 or $40,520 in excess of the proportional value of $4,541 cited above. As a consequence, it is hereby requested that the basic contract be amended by adding the following funds to cover these extraordinary expenditures hereunder:

Excess ODC:	$40,520
G&A Expense (3.7%)	1,499
Total Additional Cost	$42,019
Additional Fee (5%)	2,101
Total Additional Cost and Fee	$44,120

PURCHASED MATERIAL - ORIGINAL SUBMISSION
(GCA 1-619-078)

1.	Gloves, Helco Safety Equipment, Wintrhop, MA -	
	a. Polyethylene, 3 boxes @ $10.20/ea	$ 31
	b. Butyl Rubber, 16 pairs @ $6.45/ea	103
	c. Nitrile - Medium, 1 case @ $18.50/ea	19
	d. Nitrile - Large, 1 case @ $22.30/ea	22
2.	Boots, latex rubber, Helco Safety Equip - 68 prs @ $5/ea . . .	340
3.	Disposal suits w/hoods, Helco Safety Equip - 4 cases @ $88.33/ea	353
4.	Organic vapor cartridges, Mine Safety Appliance, Edmund, RI - 18 boxes @ $26.95/ea	485
5.	Respirator cleaner-sanitizer, MSA - 5 boxes @ $12.95/ea . . .	65
6.	First Aid kit, Helco Safety Equip - 1 each @ $24.35/ea . . .	24
7.	Emergency eye wash unit, Helco Safety Equip - 1 ea @$22.51/ea	23
8.	Eye wash refills, Helco Safety Equip - 3 each @ $6.91/ea. . .	21
9.	Chemical splash goggles, Helco Safety Euip - 4 pr @$3.10/ea .	12
10.	Miscellaneous materials including duct tap, hardware, cleaners, solvents, towels, etc.	250
	TOTAL ORIGINAL SUBMISSION PURCHASED MATERIAL.	$1,748

DETAILED TRAVEL ESTIMATE - ORIGINAL SUBMISSION
(GCA 1-619-078)

1. Boston, Mass. - Minneapolis, Minnesota

1 Trip	3 Days/Trip	1 Man/Trip	
Air Fare	- 1 Trip @ $443/Trip		$ 443
Per Diem	- 3 Days @ $ 60/Day		180
Car Rental	- 3 Days @ $ 45/Day		135
Local Travel	- 1 Trip @ $ 30/Trip		30
			$ 788

2. Boston, Mass. - Minneapolis, Minnesota

1 Trip	5 Days/Trip	2 Man/Trip	
Air Fare	- 2 Trip @ $443/Trip		$ 886
Per Diem	- 10 Days @ $ 60/Day		600
Car Rental	- 5 Days @ $ 45/Day		225
Local Travel	- 2 Trip @ $ 30/Trip		60
			$1,771

3. Boston, Mass. - Minneapolis, Minnesota

3 Trips	10 Days/Trip	1 Man/Trip	
Air Fare	- 3 Trip @ $443/Trip		$1,329
Per Diem	- 30 Days @ $ 60/Day		1,800
Car Rental	- 30 Days @ $ 45/Day		1,350
Local Travel	- 3 Trip @ $ 30/Trip		90
			$4,569

4. Boston, Mass. - Minneapolis, Minnesota

1 Trip	5 Days/Trip	1 Man/Trip	
Air Fare	- 1 Trip @ $443/Trip		$ 443
Per Diem	- 5 Days @ $ 60/Day		300
Car Rental	- 5 Days @ $ 45/Day		225
Local Travel	- 1 Trip @ $ 30/Trip		30
			$ 998

TOTAL ORIGINAL SUBMISSION TRAVEL $8,126

SUBCONTRACTING - ORIGINAL SUBMISSION
(GCA 1-619-078)

Well drilling services - Braun Environmental Laboratories, Inc., Minneapolis, Minnesota - firm fixed price subcontract for installation of 18 wells, as follows:

Item	Cost
Health and safety equipment	$ 700
Standby time - 10 hours @ $55/hr	550
Borings in clean background locations - 3 each @ $915/ea	2,745
Borings in swamp - 3 each @$1,185/ea	3,555
Borings at Reilly Tar Site on solid ground - 12 each @ $1,005/ea	12,060
Piezometer installation at 60 feet - 9 each @ $825/ea	7,425
Lab soil tests - 42 each @ $40.62/ea	1,706
Storage and shipment of samples - 108 each @ $3/ea	324
Reports and period review	2,205
Disposal of drill cuttings and mud	1,730
TOTAL ORIGINAL SUBMISSION SUBCONTRACTING	$33,000

OTHER DIRECT COSTS - ORIGINAL SUBMISSION
(GCA 1-619-078)

Computer useage, IBM 3033 - GCA Corporate Headquarters, Bedford, MA -	
3.5 hours @ $625/hour	$2,187
TOTAL ORIGINAL SUBMISSION OTHER DIRECT COSTS.	$2,187

GCA/TECHNOLOGY DIVISION
A DIVISION OF GCA CORPORATION
Bedford, Massachusetts 01730

16 March 1983

COST ESTIMATE - ASSIGNMENT CHANGE NO. 2

SOIL SAMPLES AT THE REILLY TAR SITE

Contract No. 68-02-3168, Technical Service Area 3, Work Assignment No. 78, Assignment Change No. 2 (GCA 1-619-078)

Group Scientist/Engineer	290 hours @ $19.89/hr[7]	$ 5,768
Principal Scientist/Engineer	40 hours @ $15.74/hr	630
Staff Scientist/Engineer	80 hours @ $13.91/hr	1,113
Senior Scientist/Engineer	100 hours @ $12.21/hr	1,221
Scientist/Engineer	190 hours @ $10.24/hr	1,946
Technical Illustrator	35 hours @ $ 7.95/hr	278
Technical Typist	70 hours @ $ 7.04/hr	493
Total Direct Labor	805 hours[6]	$11,449
Salary Related Cost[8] (32.5%)		3,721
Subtotal		15,170
Engineering Overhead[8] (94.0%)		14,260
Travel (see Page 9)		6,864
Subcontracting (see Page 10)		15,186
Other Direct Costs (see Page 11)		1,250
Subtotal		52,730
General & Administrative Expense[8] (3.7%)		1,951
Total Estimated Cost		54,681
Fixed Fee[9]		1,846
TOTAL ASSIGNMENT CHANGE NO. 2		$56,527

NOTES PERTAINING TO PAGE 7:

(6) Of this 805 MH total, 700 are technical man-hours in contrast to the Government estimate of 1,310 TMH in Assignment Change No. 2.

(7) Use of modified 1983 direct labor bidding rate schedule requested on 14 February 1983,

(8) Use of GCA/FY 1983 indirect rates requested on 17 January 1983.

(9) In accordance with Article VIII, Paragraphs C.1 and C.2 of Option No. 3 to the basic contract, the fee employed herein is calculated at $2.637 per technical man-hour.

(10) Additional Contract Funding - the total ODC proportional to a Work Assignment of 700 TMH is $2,659, the total estimated cost is $26,370, the fee is $1,846 for a total cost of $28,216. As can be seen from Pages 9-11, the total estimated ODC pertinent to Assignment Change No. 2 is $23,300 or $20,641 in excess of the proportional value of $2,659 cited above. As a consequence, it is hereby requested that the basic contract be amended by adding the following funds to cover these extraordinary expenditures thereunder:

Excess ODC	$20,641
G&A Expense (3.7%)	764
Total Additional Cost	$21,405
Additional Fee (5%)	1,070
Total Additional Cost and Fee	$22,475

When combined with the calculated value in Note (5), Page 2, a total of $66,595 results.

DETAILED TRAVEL ESTIMATE - ASSIGNMENT CHANGE NO. 2
(GCA 1-619-078)

1. Boston, Mass. - Minneapolis, Minnesota

1 Trip	20 Days/Trip	1 Man/Trip	
Air Fare	- 1 Trip @ $473/Trip		$ 473
Per Diem	- 20 Days @ $ 60/Day		1,200
Car Rental	- 20 Days @ $ 45/Day		900
Local Travel	- 1 Trip @ $ 30/Trip		30
			$2,603

2. Boston, Mass. - Minneapolis, Minnesota

1 Trip	17 Days/Trip	1 Man/Trip	
Air Fare	- 1 Trip @ $473/Trip		$ 473
Per Diem	- 17 Days @ $ 60/Day		1,020
Car Rental	- 17 Days @ $ 45/Day		765
Local Travel	- 1 Trip @ $ 30/Trip		30
			$2,288

3. Boston, Mass. - Minneapolis, Minnesota

1 Trip	14 Days/Trip	1 Man/Trip	
Air Fare	- 1 Trip @ $473/Trip		$ 473
Per Diem	- 14 Days @ $ 60/Day		840
Car Rental	- 14 Days @ $ 45/Day		630
Local Travel	- 1 Trip @ $ 30/Trip		30
			$1,973

TOTAL ASSIGNMENT CHANGE NO. 2 TRAVEL $6,864

SUBCONTRACTING - ASSIGNMENT CHANGE NO. 2
(GCA 1-619-078)

Modification to Braun Environmental Laboratories subcontract (see Page 5):

A. MODIFICATION TO EXISTING WORK EFFORT

Item	Cost
Health and safety equipment	$ 700
Standby time	40
Borings in swamp	355
Borings at Reilly Tar Site on solid ground	4,020
Piezometer installation at 60 feet	2,970
Lab soil tests	118
Storage and shipment of samples	(177)
Reports and review	1,025
Disposal of drill cuttings and mud	(1,730)

B. ADDITIONAL WORK EFFORTS

Utility clearances	$1,000
Remobilization	495
Hollow stem auger boring additional drilling	65
Roller bit boring additional drilling	3,564
Bedrock boring additional drilling	421
Piezometer installation	1,170
Roadway signs	150
Boring lot data gathering	1,000

TOTAL ASSIGNMENT CHANGE NO. 2 SUBCONTRACTING $15,186

OTHER DIRECT COSTS - ASSIGNMENT CHANGE NO. 2
(GCA 1-619-078)

Computer useage, IBM 3033 - GCA Corporation Headquarters, Bedford, MA -

2 hours @ $625/hour	$1,250
TOTAL ASSIGNMENT CHANGE NO. 2 OTHER DIRECT COSTS.	$1,250

7.0 COST ESTIMATE

TOTAL[11] COST ESTIMATE

SOIL SAMPLES AT THE REILLY TAR SITE

Contract No. 68-02-3168, Technical Service Area 3, Work Assignment No. 78, Assignment Change No. 2 (GCA 1-619-078)

Group Scientist/Entineer	470 hours	$ 9,408
Principal Scientist/Engineer	140 hours	2,192
Staff Scientist/Engineer	80 hours	1,113
Senior Scientist/Engineer	280 hours	3,323
Scientist/Engineer	686 hours	6,742
Senior Technician	294 hours	2,226
Technical Illustrator	95 hours	732
Technical Typist	190 hours	1,245
Total Direct Labor	2,235 hours	$ 26,981
Salary Related Cost		8,769
Subtotal		35,750
Engineering Overhead		32,370
Material (see Page 3)		1,748
Travel (see ages 4 and 9)		14,990
Subcontracting (see Pages 5 and 10)		48,186
Other Direct Costs (see Pages 6 and 11)		3,437
Subtotal		136,481
General & Administrative Expense		5,050
Total Estimated Cost		141,531
Fixed Fee		4,996
TOTAL PROGRAM COST		$146,527

NOTES PERTAINING TO PAGE 12:

(11) This cost estimate, obtained by summary of Pages 1 and 7, supersedes the original submission dated 1 October 1982.

(12) Of this 2,235 MH total, 1,950 are technical man-hours which is in contrast to the total Government estimate of 3,503 technical man-hours.

CUMULATIVE PERFORMANCE
CONTRACT NO. 68-02-3168, TECHNICAL SERVICE AREA 3
WORK ASSIGNMENT NO. 78
(GCA 1-619-078) *REVISED 3/16/83*